



# Radiological Facilities Management Program

Office of Nuclear Energy  
U. S. Department of Energy

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## Background

The Office of Nuclear Energy's (NE's) *Radiological Facilities Management* program maintains a wide range of DOE nuclear and radiological facilities and their associated infrastructures in an operational, safe, secure, and environmentally compliant manner to ensure their cost-effective availability for missions in support of national priorities. These activities maintain infrastructures in two major mission areas: *Medical Isotopes*, and *Space and Defense*. Under this program, NE provides funding, guidance and oversight in the employment of vital resources and capabilities at Idaho National Laboratory (INL), Oak Ridge National Laboratory (ORNL), Los Alamos National Laboratory (LANL), Sandia National Laboratories (SNL), and Brookhaven National Laboratory (BNL). The facilities and associated real property assets managed by NE at these sites comprise a major portion of the Nation's nuclear research infrastructure. In addition, the Radiological Facilities Management program assures appropriate oversight of the operations and maintenance of the Department's Paducah Gaseous Diffusion Plant (Paducah GDP) uranium enrichment facilities to assure that USEC Inc. (USEC) meets its commitments under the 2002 DOE-USEC Agreement for the maintenance of a domestic enriched uranium fuel supply.

## Idaho National Laboratory

Under the *Radiological Facilities Management* program, the Space and Security Power Systems Facility for the assembly, testing, and delivery of radioisotope power systems (RPS) in support of Space and Defense programs was dedicated in October 2004. The facility began operations in FY 2005 and successfully assembled and delivered the RPS for the National Aeronautics and Space Administration's New Horizons/Pluto mission spacecraft launched January 19, 2006.

The Department is considering consolidation of all nuclear operations related to the production of RPS at INL. The consolidated operations would support the Space and Defense power systems infrastructure by co-locating the plutonium-238 (Pu-238) processing operations with the RPS assembly operations and reestablishing the domestic capability to produce Pu-238. Concept evaluations are being performed in FY 2006, and a final environmental impact statement is expected to be completed in the spring of 2006.

In addition, in FY 2007, the Department proposes to continue to provide fresh nuclear fuel and take back spent fuel from university research reactors. As such, the Department funds the fabrication of new fuel, shipments of

fresh fuel, and shipments of spent fuel to DOE sites. This includes shipment of fuel that results from core conversions.

## Oak Ridge National Laboratory

At ORNL, NE manages the High Flux Isotope Reactor (HFIR), the Radiochemical Engineering Development Center (REDC), and associated support facilities such as hot cells to support multiple national missions. Although operation of the HFIR is not funded by NE, this management function is carried out through the *Radiological Facilities Management* program. In addition to primary purposes of HFIR, a light water cooled reactor rated at 85 megawatts, is the production of californium-252, tungsten-188, and other isotopes for research, industrial, and medical applications. HFIR's central mission is to support neutron-scattering experiments to reveal the structure and dynamics of materials of interest to solid-state physicists, chemists, biologists, polymer scientists, metallurgists, and colloid scientists. Each year about 150 to 200 researchers use the experimental facilities at the HFIR. The hot cells at the REDC are used to extract the isotopes of transuranium elements produced in HFIR. Operations for both facilities were begun in 1966.



*Building 3047 Hot Cell*

NE also maintains remotely operated hot cells in Building 3047, the Radioisotope Development Laboratory, and manages their operation to process and package the radioisotopes produced in HFIR. Isotope products processed at this facility include: tungsten-188, actinium-225, and iron-55, among others used in the treatment of various types of cancer.

Other support facilities at ORNL associated with isotope production include: chemical and materials laboratories for processing and forming enriched stable isotopes; the materials laboratory in which a wide variety of metallurgical, ceramic, and high vacuum processing techniques are performed; and the chemical laboratory used for scraping,

leaching, dissolving, and oxidizing processes to remove unwanted materials and to place the isotope into a chemically stable form.

The unique infrastructure for iridium fabrication at ORNL is also maintained under the *Radiological Facilities Management* program to support Space and Defense missions. This infrastructure, which manufactures iridium shells and tests high-strength materials needed to safely encapsulate Pu-238, is essential to the Nation's vital space and national security RPS applications.

#### Los Alamos National Laboratory

At LANL, the *Radiological Facilities Management* program maintains the Pu-238 Processing Facilities in the Plutonium Facility-4 at Technical Area-55, including Pu-238 scrap recovery lines to recycle scrap Pu-238. These facilities provide the capability to support radioisotope power systems for upcoming space and national security applications. The Isotope Production Facility (IPF), which achieved full operation in 2005, will direct a portion of the 100 MeV proton beam from the Los Alamos Neutron Science Center Linear Accelerator to a new target station for the production of isotopes needed for nuclear medicine research. The TA-48 Hot Cell, Building RC-1, is maintained for the processing, packaging, and shipment of radioisotopes.

Isotopes produced in NE facilities at LANL include:

- Germanium-68 for use in Positron Emission Tomography (PET) scanners;
- Strontium-82 for the production of generators which are used in cardiac PET imaging; and
- Other isotopes for use in environmental and medical research.



**Isotope Production Facility**

#### Brookhaven National Laboratory and Sandia National Laboratories

At these sites, the *Radiological Facilities Management* program maintains several facilities to support isotope production and other missions. The Brookhaven Linear Isotope Producer Building 931 and Hot Cell Building 801 at BNL are used for producing, processing and packaging radioisotopes such as strontium-82, germanium-68, arsenic-73, and others that are used in medical applications. Regarding the Annular Core Research Reactor at SNL, the Department will decide in 2006 either to transfer the reactor to the National Nuclear Security Administration (NNSA) or shut it down. The reactor, which is a light-water cooled reactor and rated at 4 megawatts, has been performing validation testing for NNSA for the past several years.

<b>Program Budget</b> <b>Radiological Facilities Management Program</b> (\$ in Millions)		
	<b>FY 2006</b> <b>Adj. Approp.</b>	<b>FY 2007</b> <b>Request</b>
<b><i>Radiological Facilities Management</i></b>	<b>\$ 54.0</b>	<b>\$49.7</b>
Medical Isotopes Infrastructure	14.2	15.6
Space and Defense Infrastructure	39.3	30.7
Enrichment Facility Infrastructure	0.5	0.5
Research Reactor Infrastructure	0.0	2.9

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